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ABSTRACT

This curriculum guide for teaching business mathematics in the Connecticut Vocational-Technical School System is based on the latest thinking of instructors in the field, suggestions from mathematics authorities, and current instructional approaches in education. The curriculum guide consists of six sections: (1) career relationships and requirements; (2) instructor's goals; (3) competencies expected of students; (4) correlations with the common core of learning (matrix); (5) personal goals for students; and (6) course outline (11 units containing student competencies and essential content, suggested activities, and suggested assessment approaches). Units cover these topics: basic mathematics skills workshop; personal business mathematics; checking and savings accounts; cash purchases/charge accounts/credit cards/loans; auto transportation/housing costs; insurance/investments/recordkeeping; business expenses; purchasing and sales; marketing/warehousing and distribution/services; accounting and accounting records; and financial and information management. Appendixes list 22 suggested software items, a recommended textbook, and a reference source. (KC)

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BUSINESS MATHEMATICS

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VOCATIONAL-TECHNICAL SCHOOL SYSTEM
CONNECTICUT DEPARTMENT OF EDUCATION

1989

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BUSINESS MATHEMATICS

CURRICULUM

PREPARED BY EASTCONN
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PREPARED FOR:

CONNECTICUT STATE DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL, TECHNICAL AND ADULT EDUCATION
VOCATIONAL-TECHNICAL SCHOOL SYSTEM
MIDDLETOWN, CONNECTICUT

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1989

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FOREWORD

In 1988-89 the Connecticut Vocational-Technical School System initiated a program for the ongoing review and upgrading of all trade and academic curricula used in the System's seventeen schools to insure that each curriculum is consistent with current standards. Each curriculum is first reviewed by the appropriate Curriculum Steering Committee. That is done during the third year following the curriculum's last revision. The Curriculum Steering Committee for the trade or academic subject conducts a review and an analysis to identify outdated content, approaches, or materials. Any deficiencies are noted. During the following year a sub-committee of the Steering Committee prepares a revision of the curriculum incorporating all required changes.

This publication is the result of such a revision. The curriculum incorporates (a) the very latest thinking of instructors who teach the subject, (b) suggestions from authorities in the mathematics field, and (c) current instructional approaches in the field of education.

Special appreciation is extended to the instructors who provided input prior to the beginning of the curriculum revision. We also appreciate the suggestions and significant contribution of Ronald E. Brann, Consultant, Connecticut State Department of Education, Vocational, Technical & Adult Education, Vocational-Technical School System.

Jerry C. Bencivenga, Consultant
Vocational-Technical School System

John Bruno, Steering Committee Chairman
August 1989

INTRODUCTION

The following curriculum is intended as a plan for learning and an aid to the instructor whose responsibility it is to teach mathematics and to prepare students for involved and productive membership in society. The curriculum document consists of several sections. Each of the sections is explained below.

Career Relationships and Requirements. The instructor is the key person in the student's preparation for adult society. This section of the curriculum reminds the Instructor of some career related informational sources which should be shared with the students.

Common Core of Learning (CCL). Each of the General and Personal Goals for Students directly relates to a component of Connecticut's Common Core of Learning. However, the instruction and experiences which are provided to assist a student toward achievement of a competency may address other CCL components in varying degrees. The CCL Matrix illustrates the full range of CCL components which are effected. Instructors should refer to the complete list of CCL components found in the Appendices.

Instructor's Goals. These are the competencies expected of every successful student in the program. Competencies are stated in terms of expected student outcomes. All subsequent instructional decisions should show a relationship to one or more of these competencies.

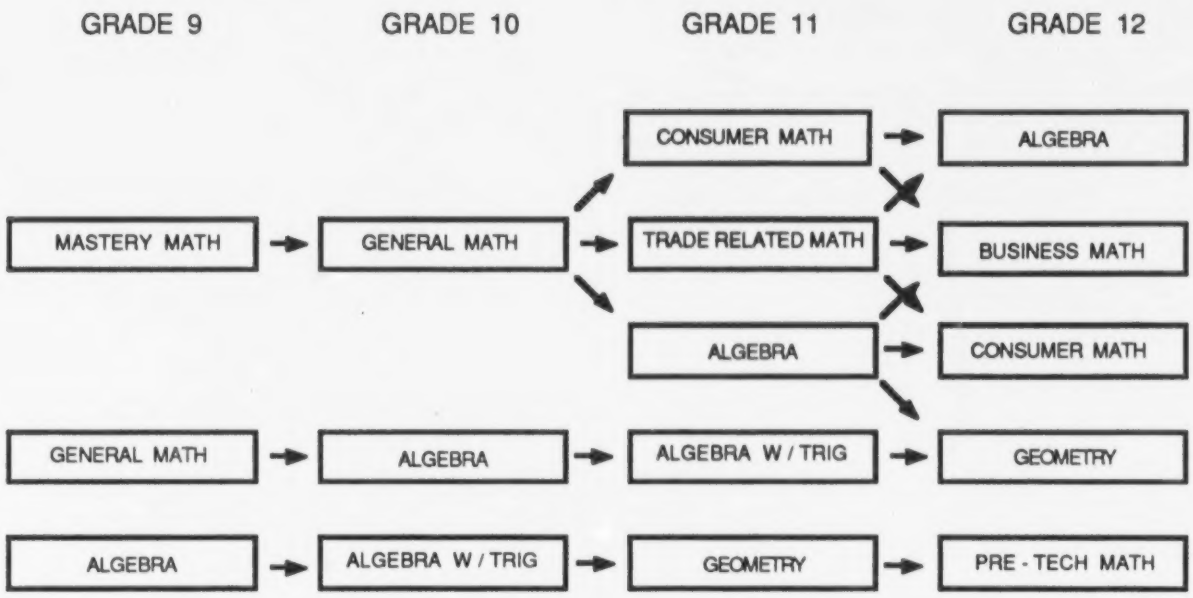
Personal Goals for Students. A successful citizen and tradesperson becomes such through the mastery of essential knowledge and skills plus the internalization of positive attitudes and values. "Personal Goals for Students" calls attention to some behaviors which should be demonstrated by responsible citizens.

Course Outline. Course content, specific objectives, and related activities are organized into coherent blocks of instruction. They may be called units or they may simply be identified by a designated period of time. Contained within each block are the differentiated Student Competencies and an outline of the essential content necessary for achievement of them. The units contain suggested activities and suggested approaches to assessment. In all cases, they are suggestions not prescriptions. The instructor is expected to commit to the goals and competencies but alternative means may be employed to achieve them.

Appendices. The appendices offer brief lists of resources appropriate to the successful completion of the program. In addition to the obvious use of these pages, the instructor may refer to the appendices when ordering supplies.

VTSS

MATHEMATICS SEQUENCE



All voc-tech schools should schedule math students by ability. When students need to learn a new math skill out of sequence for use in their shop, the shop instructor should teach it during theory.

We encourage our students to challenge themselves with advanced course work to stretch the limits of their ability and not just accept minimum achievement as a goal.

In addition, scheduled computer-assisted math is available in all schools to tutor students in need.

Finally, students should not be tracked in any one sequence. Any students showing success in a mathematics course should be considered for advanced courses. For this reason, classes are not limited to a single grade.

3-17-89

CAREER RELATIONSHIPS AND REQUIREMENTS

Successful completion of this course provides a student with the basic understanding of the math skills needed to enhance their career. He or she should also have an understanding and appreciation of the vital role of mathematics in everyday transactions. Through this knowledge the student will be able to benefit as a worker, consumer or business person, and be a more productive citizen. The mathematical principles constitute a foundation which the student can continue to learn and add to his/her individual knowledge. Students who wish to consider career options in mathematics should be encouraged to consult the Connecticut Information System (COIS) and the Occupational Outlook Handbook (United States Department of Labor) to identify related occupations and their requirements.

INSTRUCTOR'S GOALS

The Instructor will:

1. Plan learning experiences which consist of a logical introduction, sufficient development and guided practice for basic understanding and a summarizing conclusion.

2. Select delivery strategies which take into account the different interests, abilities, learning styles, and expectations of Vocational-Technical School students;

3. Plan and present lessons that demonstrate how mathematics relates to the student's selected vocation or trade area.

4. Plan instruction geared to ability levels of the students in each class.

5. Employ a variety of instructional techniques.

6. Use a variety of evaluative tools and techniques.

7. Encourage students to use their creativity and initiative.

8. Present learning experiences in such a way as to elicit higher-level thinking and critical thinking;

STUDENTS' GENERAL COMPETENCIES

The Student will:

1. Read and analyze word problems.
2. Solve basic addition, subtraction, multiplication and division problems using whole numbers, decimals, fractions and percents.
3. Use calculators and computers to improve math skills while doing business computations.
4. Interpret data and properly record information.
5. Perform repetitious tasks while maintaining a positive attitude toward task involved.
6. Understand the need for time management and priority setting.
7. Use math skills in making better economic decisions as a business manager.
8. Appreciate the vital role of mathematics in the successful operation of a business.
9. Know the general terms used in business in order to apply them to both personal and business management.
10. Develop estimating techniques to evaluate results.
11. Understand how mathematics relates to the student's selected vocation or trade area.

CORRELATIONS OF TRADE/SUBJECT COMPETENCIES
WITH CONNECTICUT'S COMMON CORE OF LEARNING

LIST OF STUDENT COMPETENCIES OR ANTICIPATED OUTCOMES	RELATED COMMON CORE OF LEARNING COMPONENTS		
TRADE/SUBJECT: BUSINESS MATHEMATICS	ATTITUDES AND ATTRIBUTES	SKILLS AND COMPETENCIES	UNDERSTANDINGS AND APTITUDES
Be able to read and analyze word problems.	D1	E8,E9	F1
Be able to solve basic addition, subtraction, multiplication and division.		D1, D2	F2
Be able to use calculators and computers to improve math skills while doing business computations.		D1	F4
Be able to interpret data and properly record information.		E3, E5, D6, D7	F8
Be willing to perform repetitious tasks while maintaining a positive attitude toward task involved.	B1		B1
Understand the need for time management and priority setting.	A2, C1		
Be able to use math skills in making better economic decisions as a business manager.	A2		F3
Appreciate the vital role of mathematics in the successful operation of a business.			F3
Know the general terms used in business in order to apply them to both personal and business management.		C3	
Be able to estimate and evaluate solutions to problems.		D5,E6,E7, E8,E9	
Understand how mathematics relates to the student's selected vocation or trade area.	A3, D3	F1	B3,B4,B5, B6,F2,F3

PERSONAL GOALS FOR STUDENTS

The Student will demonstrate a willingness to:

1. Do assigned tasks without constant supervision.
2. Work as a team member and assist others.
3. Observe safety rules.
4. Maintain books, equipment, and work stations.
5. Contribute to maintaining a positive educational environment within the classroom.

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UNIT I

BASIC MATH SKILLS WORKSHOP: A REVIEW OF FUNDAMENTALS

Suggested Instructional Time: 8 days

Unit Objective: After completing this unit, the student should demonstrate a working knowledge of the fundamental operations of whole numbers, fractions, decimals and percents. Students should be able to estimate answers, interpret data and transform units of measure in the U. S. Customary System and metric system.

Student Competencies:

After completing this unit, all students should be able to:

1. Write numbers as words for writing checks.
2. Compare numbers and know the value of those numbers.
3. Compute addition, subtraction, multiplication and division of whole numbers, decimals, fractions, and percents.
4. Calculate elapsed time in a given workframe.
5. Read and analyze tables and charts.
6. Know different units of measurement and to change from one quantity to another.
7. Solve business problems involving percentages.

UNIT II

PERSONAL BUSINESS MATHEMATICS

Suggested Instructional Time: 8 days

Unit Objective: After completing this unit, the student should know how to figure out a weekly payroll. Student should be able to read a time card and income tax table. Student should be able to calculate the net pay by using addition, subtraction, multiplication and percentages.

Student Competencies:

After completing this unit, all students should be able to:

1. Read and analyze weekly time cards.
2. Compute regular and overtime hours for payroll.
3. Compute piecework and salary problems.
4. Use percents in solving commission problems.
5. Read and interpret Federal Income Tax Tables.
6. Understand terms used in income tax problems.
7. Compute graduated and state income tax problems.
8. Find amount to be deducted for social security.
9. Tabulated total net pay, using all deductions.

UNIT III

CHECKING AND SAVINGS ACCOUNTS

Suggested Instructional Time: 8 days

Unit Objective: After completing this unit, the student should know major aspects of checking and savings accounts including deposit and withdrawal slips, and bank statements. Student should be able to compute interest and read interest tables.

Student Competencies:

After completing this unit, all students should be able to:

1. Fill out and total deposit slips.
2. Write checks correctly.
3. Compute the balance in a check register.
4. Read a bank statement and reconcile a check register and a bank statement.
5. Complete a savings account deposit slip.
6. Compute the new balance on a savings account statement and a savings account passbook or statement.
7. Calculate simple and compound interest.
8. Find compound interest with tables.

UNIT IV

CASH PURCHASES/CHARGE ACCOUNTS/CREDIT CARDS/LOANS

Suggested Instructional Time: 8 days

Unit Objective: After completing this unit, the student should understand purchasing and cost pricing. Student should be able to read and analyze charge accounts and loan tables. Student should be able to compute finance charges using a variety of methods.

Student Competencies:

After completing this unit, all students should be able to:

1. Compute sales tax and total purchase price.
2. Find unit price and be able to decide which purchase is the better buy.
3. Calculate the markdown and sale price of an item.
4. Read and analyze a charge account statement.
5. Compute finance charge by the unpaid balance method and the previous balance method and average daily balance.
6. Compute the maturity value and interest rate of a single-payment loan.
7. Compare the difference between a discount loan and a installment loan.
8. Calculate the finance charge on an installment loan.
9. Use a table to find the annual percentage rate of a loan.

UNIT V

AUTO TRANSPORTATION/HOUSING COST

Suggested Instructional Time: 8 days

Unit Objective: After completing this unit, the student should be able to calculate the cost of purchasing a new or used car, the cost of insurance and operating expenses. Student should be able to figure out mortgage loan amounts including monthly payment and interest. Student should be able to read and analyze insurance premium tables.

Student Competencies:

After completing this unit, all students should be able to:

1. Compute the sticker price of a new automobile.
2. Find the dealer's cost of a new automobile.
3. Calculate the average retail price of a used automobile.
4. Read and analyze tables to compute the annual premium for automobile insurance.
5. Compute the total cost per mile of operating and maintaining an automobile and leasing an automobile.
6. Calculate mortgage loan amounts along with monthly payment and total interest.
7. Figure the total closing cost to purchase a home.
8. Distinguish between the new principal and principal when making monthly payments.
9. Compute the assessed value and taxes of real estate.
10. Calculate the amount of Homeowners Insurance coverage and cost of insurance premium.

UNIT VI

INSURANCE/INVESTMENTS/RECORDKEEPING

Suggested Instructional Time: 8 days

Unit Objective: After completing this unit, the student should be able to analyze the three major forms of life insurance and read tables to compute cost premiums. Student should be able to calculate stock costs, buying and selling. Student should be able to figure their monthly expenditures.

Student Competencies:

After completing this unit, all students should be able to:

1. Compute health insurance premiums and amount paid by the patient for medical care.
2. Use tables to compute the annual premium for term life, whole life and endowment life insurance.
3. Use tables to compute interest on certification of deposit and compute effective annual yield.
4. Calculate the total cost of a stock or bond investment, the annual yield and annual dividend of a stock or bond investment.
5. Find the profit or loss from a stock sale.
6. Compute the average monthly expenditure.
7. Use records of past expenditures to prepare a monthly budget.
8. Compare amount budgeted to actual expenditures and personal spending.

UNIT VII

BUSINESS EXPENSES

Suggested Instructional Time: 10 days

Unit Objective: After completing this unit, the student should be able to figure the costs for hiring a new employee, the costs of living adjustments and merit increases. Student should understand other business expenses which will occur. Student should be able to determine cost of an object, break even point, and if process in or out of control.

Student Competencies:

After completing this unit, all students should be able to:

1. Compute the cost of recruiting new employees.
2. Calculate the new salary after merit increase and cost of living adjustment.
3. Compute the rate of employee benefits based on annual gross pay and total employee training costs.
4. Figure total business-travel expenses to be reimbursed.
5. Compute the prime cost of manufacturing an item and the break-even point in the number of manufactured units.
6. Use percents on defective goods to determine if the process is in or out of control.
7. Use the study results to compute the time spent on each task and percent of time spent on each task.
8. Determine the dimensions of packaging cartons.

UNIT VIII

PURCHASING AND SALES

Suggested Instructional Time: 8 days

Unit Objective: After completing this unit, the student should be able to find net price after trade discount and chain discounts. Student should estimate approximate due date and compute actual due date student should be able to find markup rate and markdown.

Student Competencies:

After completing this unit, all students should be able to:

1. Compute the trade discount and net price.
2. Calculate the trade-discount rate.
3. Use chain discounts and find final net price.
4. Compute each discount based on ordinary dating or end-of-month dating.
5. Find markup, markup rate, and net profit.
6. Determine the selling price based on cost and markup rate and based on selling price.
7. Compute the markdown in dollars and as a percent of the regular selling price.

UNIT IX

MARKETING/WAREHOUSING AND DISTRIBUTION/SERVICES

Suggested Instructional Time: 8 days

Unit Objective: After completing this unit, the student should be able to use formula for calculating rate of response to an opinion survey. Student should be able to determine annual sales and market share of a new product. Student will know the added cost factors that go into a cost projection of a given product.

Student Competencies:

After completing this unit, all students should be able to:

1. Compute the rate of a particular response in an opinion survey.
2. Calculate the annual sales potential of a new product.
3. Find the market share of a new product.
4. Use a graph to compute projected sales.
5. Use the factor method to compute projected sales.
6. Determine newspaper and radio and television advertising costs and then compute the selling price that will result in the highest possible profit.
7. Compute total storage space, total inventory and use the average-cost method to find inventory value.
8. Calculate total shipping cost by air freight and by truck.
9. Compute monthly building rental charge including maintenance, equipment, utilities and professional services.

UNIT X

ACCOUNTING AND ACCOUNTING RECORDS

Suggested Instructional Time: 8 days

Unit Objective: After completing this unit, the student should be able to complete a payroll registry, determine the cost of a work station or department. Student will be able to use a variety of methods to calculate depreciation. Student will have knowledge of the workings of an accounting department including assets, liabilities, income statements and balance sheets.

Student Competencies:

After completing this unit, all students should be able to:

1. Complete the payroll register.
2. Compute the percent a particular business expense is of the total expenses also compute a department's share of the total business expense.
3. Use the straight line method to determine depreciation.
4. Calculate depreciation by the sum-of-the year method, double-declining-balance method and accelerated cost-recovery system.
5. Finds owner's equity by tabulating assets and liabilities.
6. Complete the percent that an item on the income statement is of the net sales and compare two income statements and compute the percent of change.

UNIT XI

FINANCIAL AND INFORMATIONAL MANAGEMENT

Suggested Instructional Time: 8 days

Unit Objective: After completing this unit, the student should be able to compute taxable income, corporate income tax, selling, expenses and net proceeds from an issue of stocks and bonds. Students should have a working knowledge of data processing, and be able to read and analyze data reports.

Student Competencies:

After completing this unit, all students should be able to:

1. Compute the taxable income and corporate income tax.
2. Calculate the selling expenses and the net proceeds from an issue of stocks and bonds.
3. Find the maturity value of a commercial loan, the cost of a Treasury Bill, and the net interest from commercial paper.
4. Use data field keys to update and create new records.
5. Classify information into files.
6. Use information that has been stored in a data base.
7. Update a data base where real-time processing is involved.
8. Retrieve and analyze data.
9. Analyze the information given in a report.
10. Prepare Balance Sheet, Post & Ledger Statement.

APPENDIX A

Computer Resource Software

Item	Software		Computer
1.	Math Blaster		Mac
2.	Math Blaster Plus		Apple IIGS/IIe
3.	Alge-Blaster		Apple IIGS
4.	Simple Accounting		Mac
5.	Math Talk		Mac
6.	Jumping Math Flash		Apple IIGS
7.	Math Type		Mac
8.	MacDraft		Mac
9.	Pict-O-Graph		Mac
10.	Geometry		Mac
11.	Calculus		Mac
12.	Problem Solving in Algebra Intro and	Lessons 1 - 7	Apple II GS/IIe
13.	Problem Solving in Algebra	Lessons 8 - 14	Apple II GS/IIe
14.	Problem Solving in Algebra	Lessons 15 - 21	Apple II GS/IIe
15.	Problem Solving in Algebra	Lessons 22 - 30	Apple II GS/IIe
16.	Problem in Algebra	Lessons 31 - 38	Apple II GS/IIe
17.	Geometry - Funky Chicken		Apple II GS/IIe
18	Geometry - Exploring Triangles		Apple II GS/IIe
19.	Estimation - Estimation Invasion		Apple II GS/IIe
20.	Estimation - Round up, Round down		Apple II GS/IIe
21.	Math Skills - Junior High Level		Apple II GS/IIe
22.	Math Skills - Elementry Level		Apple II GS/IIe

APPENDIX B

RECOMMENDED TEXTBOOK

Lange W., Mason R., Rousos T. Business Mathematics Boston, MA: Houghton Mifflin Company 1986.

APPENDIX C

REFERENCE SOURCE

Hoffman H., Stewart J., General Recordkeeping New York, N.Y. McGraw Hill Book Company, 1981.

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